

Monitoring of SAF R&D, demonstration and deployment

Four speakers presented their research activities on the monitoring of SAF R&D, demonstration projects and production deployment in the third online seminar of AMF Task 66. First, **Leonie Lauer (CENA)** provided an outlook on SAF volumes, technologies and market dynamics. Subsequently, **Preeti Jain (IATA)** presented the view of IATA on SAF deployment on a global level. Next, **Esther Hegel (RSB)** provided insights from SAF sustainability certification. Lastly, **Stephen Dooley (EU SAF Clearing House)** reported on drivers and drawbacks for the global market ramp up, with a focus on ASTM certification.

Introduction

The demand for SAF will increase due to the IEA's net-zero target, due to policies such as the ReFuelEU Aviation Initiative and due to the growth of the sector. To satisfy this demand not only an upscaling of current plants, projects and technologies is needed. It also needs new production technologies, a clearer statement on fuel requirements and guidance through the often very complex certification landscape.

Discrepancies between SAF capacity outlooks depend on the monitoring methodology. For example, IATA includes renewable fuels volumes, with a potential to be used in aviation, whereas CENA only includes dedicated SAF projects.

SAF production capacity outlook

In 2025, SAF covered less than 1% of global jet fuel consumption. However, until 2030 there are 160 to 265 SAF projects with a joint volume of 35.4 to 55 Mt (million tons) announced worldwide. Most of these projects are planned in Germany and the USA and about 80% of these volumes will be biofuels, with HEFA remaining the dominant technology until 2030 on all continents. Due to feedstock limitations, there must be diversification of SAF production technologies and thus feedstock supply. The planned volumes of e-SAF globally amount to between 2.2 and 7.2 Mt. Many SAF projects are announced, but the average project size is getting smaller. From the announced volumes, less than a quarter is already being produced, less than 20% are under construction or in commissioning and about half of the volumes are planned. The overall global development on SAF project announcements is positive but declining in Europe. The 2030 quota of ReFuelEU Aviation is expected to be achieved for bio-SAF (3 Mt). As for e-SAF, the achievement of the sub-quota (0.6 Mt) is not guaranteed. There are projects announced, but these are low in volume and in an early technology or planning phase.

Until 2050 more than 500 Mt of SAF will be required per year to reach the IEA's net-zero target, most likely largely provided by a technology mix of HEFA, Gasification-FT, ATJ and e-SAF. From a current perspective, there will be a shortfall of SAF of about 100 Mt/y. A global feedstock assessment for SAF production from IATA confirms that technology roll-out will be the main bottleneck to reach net-zero, not feedstock availability.

SAF sustainability certification

To access the market, ASTM and sustainability certification are required, because only certified SAF can qualify under EU and global schemes. Due to the many different regions and schemes the certification landscape is complex and often fragmented. Therefore, it is important that certification requirements are already considered during R&D. Because for example not all feedstocks are eligible in all certification schemes.

There are three main SAF certification schemes. RSB global is a voluntary certification that is open to all global market participants. EU RED guarantees access to the European market. And lastly CORSIA, which is about global access to the fuel markets.

The EU project ICARUS aims to help researchers to understand the complex certification landscape.

ASTM certification

To access the market, an ASTM certification for SAF is mandatory. This can result in a big barrier for small SAF producers, because large volumes of SAF are needed for the evaluation. This results in huge investments for producers without knowing if they will be able to sell their product. Another barrier in R&D of SAF is that SAF needs to be approved again if the feedstock or the technology changes.

Key Messages

- Many projects for SAF production are being announced, but they are low in volume and in an early technological state
- There is a need for upscaling to meet SAF demand and EU quota
- Certification is key to accessing new markets and needs to be considered at an early stage of development.
- Harmonized standards are needed to grow the global market

Summary sheet – Online seminar 3/10

Task 66: Recent Progress in SAF Research

Research gaps

- Further improvements in production technologies and feedstock flexibility are needed to bring technologies to higher TRLs.
- Stable CO₂ sources must be identified, since carbon removal technologies are not yet sufficiently deployed.